Table 7-9. Screening of nonradionuclide organic contaminants. Bold text indicates that contaminant concentration exceeded the EBSL.

Contaminant	1,1-Dichloro-ethane	1,1-Dichloro-ethylene	1,1,1-Trichloro-ethane	2-Butanone	2-Hexanone[b]	2-Methyl-naphthalene[c]	4-Methyl-2-pentanone
EBSL (mg/kg)[a]	6.95E+00	2.61E+00	4.08E+02	1.91E+01	1.91E+01	3.25E-02	NA
CFA-01							
CFA-02			1.00E-03	3.30E+00	4.50E-02	**4.70E-02**	**1.70E-02**
CFA-03							
CFA-04				2.00E-03			
CFA-05 Ditch							
CFA-05 Pond				6.10E-01	6.60E-02		**6.50E-02**
CFA-06							
CFA-08		3.00E-03					
CFA-10							
CFA-12							
CFA-13							
CFA-15							
CFA-17/47	3.60E-01		5.10E+00				
CFA-21							
CFA-23							
CFA-24							
CFA-25							
CFA-26							
CFA-27							
CFA-28							

Table 7-9. (continued).

Contaminant	1,1-Dichloro-ethane	1,1-Dichloro-ethylene	1,1,1-Trichloro-ethane	2-Butanone	2-Hexanone[b]	2-Methyl-naphthalene[c]	4-Methyl-2-pentanone
EBSL (mg/kg)[a]	6.95E+00	2.61E+00	4.08E+02	1.91E+01	1.91E+01	3.25E-02	NA
CFA-29							
CFA-30							
CFA-31							
CFA-32							
CFA-34							
CFA-37							
CFA-38							
CFA-40							
CFA-41							
CFA-43							
CFA-44							
CFA-45							
CFA-48							
CFA-49							
CFA-50							
CFA-51							

Table 7-9. (continued).

Contaminant	Acenaphthene	Acetone	Anthracene	Aroclor-1254	Aroclor-1260
EBSL (mg/kg)[a]	2.37E+01	2.78E-01	1.35E+02	1.43E-02	8.02E+00
CFA-01					
CFA-02	9.60E-02	**5.80E+00**	2.10E-01		
CFA-03					
CFA-04		1.70E-02		**2.80E+00**	
CFA-05 Ditch					
CFA-05 Pond		8.00E-02			1.47E+00
CFA-06					
CFA-08		2.30E-02		**1.30E+00**	8.80E-01
CFA-10				**1.40E+00**	1.30E+00
CFA-12				**2.10E-01**	
CFA-13				**1.00E+01**	
CFA-15					
CFA-17/47	1.20E-01	2.20E-01			
CFA-21					
CFA-23					
CFA-24					
CFA-25					
CFA-26					
CFA-27					
CFA-28					

Table 7-9. (continued).

Contaminant	Acenaphthene	Acetone	Anthracene	Aroclor-1254	Aroclor-1260
EBSL (mg/kg) [a]	2.37E+01	2.78E-01	1.35E+02	1.43E-02	8.02E+00
CFA-29					
CFA-30					
CFA-31					
CFA-32					
CFA-34					
CFA-37					
CFA-38					
CFA-40					
CFA-41					
CFA-43					
CFA-44					
CFA-45					
CFA-48					
CFA-49					
CFA-50					
CFA-51					

Table 7-9. (continued).

Contaminant EBSL (mg/kg)[a]	Benzene 5.50E+00	Benzo(a) anthracene 3.02E+00	Benzo(a) pyrene 3.34E-02	Benzo(b) fluoranthene[c] 3.25E-02	Benzo(g,h,i) perylene[c] 3.25E-02	Benzo(k) fluoranthene[c] 4.90E-02	Bis(2-ethyl hexyl)phthalate 2.63E+00	Butylbenzyl phthalate 1.43E+01
CFA-01		1.40E-01	**8.90E-01**	**2.10E-01**	**1.60E-01**	**2.00E-01**		
CFA-02	3.00E-03	6.10E-01	**5.90E-01**	**8.90E-01**	**5.20E-01**	**1.20E+00**	1.30E+00	8.80E-02
CFA-03							3.60E-02	
CFA-04							3.60E-02	
CFA-05 Ditch								
CFA-05 Pond	4.00E-03							
CFA-06								
CFA-08	4.00E-03		**4.20E-02**				1.60E+00	
CFA-10								
CFA-12			**5.90E-02**		**1.50E-01**			
CFA-13		**9.00E+00**		**4.20E+00**	**5.10E+00**	**3.20E+00**		
CFA-15								
CFA-17/47	4.80E-02		**1.37E-01**	**2.00E-01**	**1.60E-01**			
CFA-21								
CFA-23								
CFA-24								
CFA-25								
CFA-26								
CFA-27								
CFA-28								

Table 7-9. (continued).

Contaminant	Benzene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b) fluoranthene[c]	Benzo(g,h,i) perylene[c]	Benzo(k) fluoranthene[c]	Bis(2-ethyl hexyl)phthalate	Butylbenzyl phthalate
EBSL (mg/kg)[a]	5.50E+00	3.02E+00	3.34E-02	3.25E-02	3.25E-02	4.90E-02	2.63E+00	1.43E+01
CFA-29								
CFA-30								
CFA-31								
CFA-32								
CFA-34								
CFA-37								
CFA-38								
CFA-40								
CFA-41								
CFA-43								
CFA-44								
CFA-45								
CFA-48								
CFA-49								
CFA-50								
CFA-51							2.70E-01	

Table 7-9. (continued).

Contaminant	Carbon Disulfide	Chloromethane	Chrysene	Dibenz(a,h) – anthracene[c]	Dibenzofuran	Di-n-butyl - phthalate	Di-n-octyl – phthalate
EBSL (mg/kg)[a]	5.91E-01	NA	2.27E-01	3.25E-02	NA	1.50E+01	4.73E+01
CFA-01			**4.50E+02**				
CFA-02	4.00E-03		**9.20E-01**	**3.80E-01**	**3.90E-02**	8.40E-02	
CFA-03							
CFA-04						2.90E-01	3.50E-01
CFA-05 Ditch							
CFA-05 Pond							
CFA-06							
CFA-08		**5.00E-03**				1.30E-01	
CFA-10							
CFA-12							
CFA-13			**7.90E+00**				
CFA-15							
CFA-17/47			1.60E-01				
CFA-21							
CFA-23							
CFA-24							
CFA-25							
CFA-26						4.90E-01	
CFA-27							
CFA-28							

Table 7-9. (continued).

Contaminant	Carbon Disulfide	Chloromethane	Chrysene	Dibenz(a,h) – anthracene[c]	Dibenzofuran	Di-n-butyl - phthalate	Di-n-octyl – phthalate
EBSL (mg/kg)[a]	5.91E-01	NA	2.27E-01	3.25E-02	NA	1.50E+01	4.73E+01
CFA-29							
CFA-30							
CFA-31							
CFA-32							
CFA-34							
CFA-37							
CFA-38							
CFA-40							
CFA-41							
CFA-43							
CFA-44							
CFA-45							
CFA-48							
CFA-49							
CFA-50							
CFA-51							

Table 7-9. (continued).

Contaminant	Ethylbenzene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene[c]	Lindane	Methylene chloride	Naphthalene	Pentachloro – phenol
EBSL (mg/kg)[a]	2.76E+01	1.69E+01	1.69E+01	3.25E-02	NA	4.27E-01	7.17E+00	NA
CFA-01		1.00E-01		**8.30E-02**			3.80E-02	
CFA-02	1.70E-02	1.20E+00	7.90E-02	**6.50E-01**		7.40E-02	1.50E-01	**7.40E-02**
CFA-03								
CFA-04								
CFA-05 Ditch								
CFA-05 Pond						4.00E-02		
CFA-06								
CFA-08						4.00E-03	4.70E-02	
CFA-10								
CFA-12								**2.50E-01**
CFA-13				**4.60E+00**				
CFA-15		3.80E-02						
CFA-17/47	1.33E+00		1.00E-01					
CFA-21								
CFA-23								
CFA-24								
CFA-25								
CFA-26								
CFA-27	5.00E-02							
CFA-28								

Table 7-9. (continued).

Contaminant	Ethylbenzene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene[c]	Lindane	Methylene chloride	Naphthalene	Pentachloro – phenol
EBSL (mg/kg)[a]	2.76E+01	1.69E+01	1.69E+01	3.25E-02	NA	4.27E-01	7.17E+00	NA
CFA-29								
CFA-30	1.00E-01							
CFA-31	7.87E-01							
CFA-32								
CFA-34								
CFA-37								
CFA-38								
CFA-40								
CFA-41								
CFA-43								
CFA-44								
CFA-45								
CFA-48								
CFA-49								
CFA-50								
CFA-51								

Table 7-9. (continued).

Contaminant	Phenanthrene	Phenol	Pyrene	Tetrachloro - ethylene	Toluene	TPH	Trichloro - ethylene	Xylene
EBSL (mg/kg) [a]	1.35E+02	6.33E+00	2.03E+01	1.62E+00	3.02E+01	5.16E+01	1.74E+01	2.78E-01
CFA-01			4.40E-01					
CFA-02	1.30E+00		2.30E+00	7.00E-03	5.10E-02			9.90E-02
CFA-03								
CFA-04					1.00E+00			
CFA-05 Ditch								
CFA-05 Pond				7.60E-02				
CFA-06								
CFA-08		1.10E+00			6.00E-03		4.00E-03	
CFA-10								
CFA-12								
CFA-13			**2.40E+01**		4.00E-03		2.10E-01	2.00E-03
CFA-15			5.90E-02					
CFA-17/47	1.40E-01		1.1E+01					6.90E+00 [d]
CFA-21						**5.40E+04**		
CFA-23					9.00E+00	**1.00E+02**		
CFA-24						**2.60E+03**		
CFA-25						2.00E+01		
CFA-26		3.10E-02				**3.47E+03**		
CFA-27					6.00E-02	**1.10E+03**		1.00E-01
CFA-28						**5.74E+01**		

Table 7-9. (continued).

Contaminant	Phenanthrene	Phenol	Pyrene	Tetrachloro - ethylene	Toluene	TPH	Trichloro - ethylene	Xylene
EBSL (mg/kg)[a]	1.35E+02	6.33E+00	2.03E+01	1.62E+00	3.02E+01	5.16E+01	1.74E+01	2.78E-01
CFA-29						9.00E+00		
CFA-30						**7.60E+01**		
CFA-31					3.50E+00	**5.61E+03**		**6.69E+00**
CFA-32						3.00E+01		
CFA-34						**2.90E+02**		
CFA-37						**1.80E+02**		
CFA-38						**4.27E+02**		
CFA-40					2.00E-03	**<6.25E+02**[e]		
CFA-41						**<1.00E+03**[e]		
CFA-43								
CFA-44								
CFA-45						**<1.00E+3**[e]		
CFA-48								
CFA-49								
CFA-50								
CFA-51								

a. The minimum EBSL, in mg/kg, for all receptors/functional groups.

b. No EBSL exists for this contaminant, therefore, the EBSL for 2-butanone was used.

c. No EBSL exists for this contaminant, therefore, the EBSL for benzo(a)pyrene was used.

d. Maximum concentration from a sample collected at 10 ft. Other samples collected at 10 ft. were ≤0.094 mg/kg. Therefore, the site was eliminated.

e. Samples were screened using immunoassay, with a detection limit of 625 mg/kg at CFA-40 and a detection limit of 1,000 at CFA-41 and CFA-45.

Table 7-10. Screening of radionuclide contaminants. Bold text indicates contaminant concentration exceeded background and the EBSL.

Contaminant	Ag-108m	Am-241	Ba-133	Bi-212	Bi-214	Co-60	Cs-134	Cs-137	Eu-152
Background (pCi/g)	NA	1.90E-02	NA	NA	NA	NA	NA	1.28E+00	NA
EBSL (pCi/g)[a]	1.83E+03	1.78E+01	7.34E+03	1.23E+03	1.94E+03	1.18E+03	1.90E+03	4.95E+03	2.18E+03
CFA-01						1.00E-01		8.80E-01	
CFA-02									
CFA-03								3.07E-01	
CFA-04								2.00E-00	
CFA-05[b]		2.72E+00		1.72E+00	1.37E+00				
CFA-06									
CFA-08		1.40E-01				2.41E-01		1.80E+02	4.60E-01
CFA-10									
CFA-12	2.46E+00	2.37E+01	7.70E-01			2.90E+00	9.40E-01	1.07E+03	1.06E+01
CFA-13		9.40E+00				7.99E-02		9.88E-01	
CFA-15		1.38E-02							
CFA-17/47									
CFA-21									
CFA-23									
CFA-24									
CFA-25									
CFA-26									
CFA-27									
CFA-28									

Table 7-10. (continued).

Contaminant	Ag-108m	Am-241	Ba-133	Bi-212	Bi-214	Co-60	Cs-134	Cs-137	Eu-152
Background (pCi/g)	NA	1.90E-02	NA	NA	NA	NA	NA	1.28E+00	NA
EBSL (pCi/g) [a]	1.83E+03	1.78E+01	7.34E+03	1.23E+03	1.94E+03	1.18E+03	1.90E+03	4.95E+03	2.18E+03
CFA-29									
CFA-30									
CFA-31									
CFA-32									
CFA-34									
CFA-37									
CFA-38									
CFA-40									
CFA-41									
CFA-43									
CFA-45									
CFA-48									
CFA-49						3.90E-02			
CFA-50									
CFA-51								1.10E-01	

Table 7-10. (continued).

Contaminant	Eu-154	K-40	Mn-54	Pb-212	Pb-214	Pa-234m	Pu-238	Pu-239	Ra-226
Background (pCi/g)	NA	NA	NA	NA	NA	NA	9.10E-03	1.90E-01	NA
EBSL[a] (pCi/g)	2.48E+03	NA	3.53E+03	1.45E+04	6.78E+03	2.37E+03	1.78E+01	1.89E+01	2.04E+01
CFA-01									
CFA-02									
CFA-03									
CFA-04						5.30E-01			4.15E+00
CFA-05[b]		1.90E+00		1.50E+00	1.38E+00			4.29E+00	2.93E+00[c]
CFA-06									
CFA-08	1.10E+00		7.52E-02				2.00E+00	2.90E+00	5.71E+00
CFA-10									
CFA-12	7.30E-01						1.01E+00	6.00E-02	
CFA-13								4.54E-03	3.37E+00
CFA-15									2.54E+00
CFA-17/47									
CFA-21									
CFA-23									
CFA-24									
CFA-25									
CFA-26									
CFA-27									
CFA-28									

Table 7-10. (continued).

Contaminant	Eu-154	K-40	Mn-54	Pb-212	Pb-214	Pa-234m	Pu-238	Pu-239	Ra-226
Background (pCi/g)	NA	NA	NA	NA	NA	NA	9.10E-03	1.90E-01	NA
EBSL[a] (pCi/g)	2.48E+03	NA	3.53E+03	1.45E+04	6.78E+03	2.37E+03	1.78E+01	1.89E+01	2.04E+01
CFA-29									
CFA-30									
CFA-31									
CFA-32									
CFA-34									
CFA-37									
CFA-38									
CFA-40									
CFA-41									
CFA-43									
CFA-45									
CFA-48									
CFA-49									1.83E+00
CFA-50									
CFA-51									

Table 7-10. (continued).

Contaminant	Sr-90	Th-234	Tl-208	U-234	U-235	U-238	Zn-65	Zr-95
Background (pCi/g)	7.60E-01	NA	NA	1.95E-00	NA	1.85E-00	NA	NA
EBSL[a] (pCi/g)	3.34E+03	4.16E+04	NA	2.05E+01	2.27E+01	2.32E+01	5.21E+03	3.69E+03
CFA-01								
CFA-02								
CFA-03								
CFA-04	6.30E+00	4.80E-01		5.84E+00[b]	1.61E+00	9.43E+00[b]		
CFA-05[b]			1.41E+00					
CFA-05								
CFA-06								
CFA-08	1.67E+01			2.80E+00	4.40E-01	1.80E+00		1.01E-01
CFA-10								
CFA-12	2.40E+00			2.56E+01	2.40E+00	1.82E+01	8.00E-02	
CFA-13	1.99E-01			2.34E+00	5.52E-01	2.53E+00	1.53E-01	
CFA-15	1.66E-01			1.01E+00	6.31E-02	9.67E-01	1.40E-01	
CFA-17/47								
CFA-21								
CFA-23								
CFA-24								
CFA-25								
CFA-26								
CFA-27								
CFA-28								

Table 7-10. (continued).

Contaminant	Sr-90	Th-234	TI-208	U-234	U-235	U-238	Zn-65	Zr-95
Background (pCi/g)	7.60E-01	NA	NA	1.95E-00	NA	1.85E-00	NA	NA
EBSL[a] (pCi/g)	3.34E+03	4.16E+04	NA	2.05E+01	2.27E+01	2.32E+01	5.21E+03	3.69E+03
CFA-29								
CFA-30								
CFA-31								
CFA-32								
CFA-34								
CFA-37								
CFA-38								
CFA-40								
CFA-41								
CFA-43								
CFA-45								
CFA-48								
CFA-49								
CFA-50								
CFA-51								

a. The minimum EBSL for all receptors/functional groups.

b. Reflects the maximum concentration of the ditch and the main pond.

c. The 95% UCL of the arithmetic mean was used to estimate exposure-point concentrations. It is acceptable to screen the EBSL against the UCL.

considered in the human health risk assessment, the concentrations generally came from Track 1 and Track 2 Decision Documents; in these cases, it is assumed that maximum concentrations were used in the documents, though this is not always the case. Blank cells in the tables indicate that the contaminant was either not sampled or not detected at the site.

The stepwise decision process for inclusion of a contaminant in the WAG ERA was:

1. If the site concentration of the contaminant (usually the maximum) does not exceed the 95/95% upper tolerance limit (UTL) for background concentrations, then the contaminant will not be considered in the ERA for that site.

2. If the site concentration of the contaminant does not exceed the EBSL concentration, then the contaminant will not be considered in the WAG ERA for that site.

3. As with the human health it is appropriate to screen six inorganic constituents which are not associated with toxicity under normal circumstances. These include aluminum, calcium, magnesium, potassium, iron, and sodium. These will be eliminated if the concentrations is less than 10x background.

4. Otherwise, the contaminant is included in the WAG ERA for the site.

7.2.6.2 Summary of Screening Process. The 29 sites retained in the OU 4-13 ERA are summarized in Table 7-11. Thirteen sites were retained for TPH contamination (CFA-21, CFA-23, CFA-24, CFA-26, CFA-27, CFA-28, CFA-30, CFA-34, CFA-37, CFA-38, CFA-40, and CFA-41 and CFA-45). Six sites were retained for metals (CFA-06, CFA-15, CFA-43, CFA-44, CFA-48, and CFA-51). Two sites were retained for PCBs & metals (CFA-04 and CFA-10). Three sites were retained for metals and organic compounds (CFA-01, CFA-02, and CFA-05). Two sites were retained for PCBs, metals and organic compounds (CFA-08 and CFA-13). Two sites were retained for organic compounds (CFA-12 and CFA-17/47). One site was retained for TPH and an organic compound (CFA-31). No sites were retained for radiological contaminants. Sites for which all contaminants have been eliminated during the screening process will not be considered in the WAG 4 ERA.

7.2.7 Pathways of Contaminant Migration and Exposure

The potential risk posed by contaminants in surface and subsurface soil and surface water for WAG 4 sites of concern was considered in this assessment.

7.2.7.1 Surface Soil. Contaminated surface soil represents the major source of possible contaminant exposure for WAG 4 ecological components. Surface soil, as defined for use in the INEEL WAG ERAs, includes the uppermost 15 cm (0.5 ft). Many of the WAG 4 sites of concern represent sources of surface soil contamination resulting from past contamination.

The ecological pathways/exposure model for WAG 4 contaminated surface soil is shown on Figure 7-4. This model depicts the following mechanisms for surface soil transport of contaminants:

- Wind and water erosion
- Leaching and infiltration
- Plant uptake